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(56) Documents Cited

GB 2269090 A GB 2203636 A GB 2201887 A

GB 2175799 A GB 2070922 A GB 0921206 A

GB 0751211 A GB 0728343 A GB 0469793 A

EP 0290873 A2 US 4875791 A

(58) Field of Search

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INT CL<sup>6</sup> A46B 11/00 11/02 11/04

## (54) Toothbrush

(57) A toothbrush has a head (1), on which the bristles (2) are mounted. The head has holes which are connected by a conduit (5), in a handle (4) to a chamber (6) containing liquid so that liquid in the chamber is forced out through the holes to assist in teeth cleaning. The chamber can be pressurised by means of a compressed gas or by a pump operated by the user.

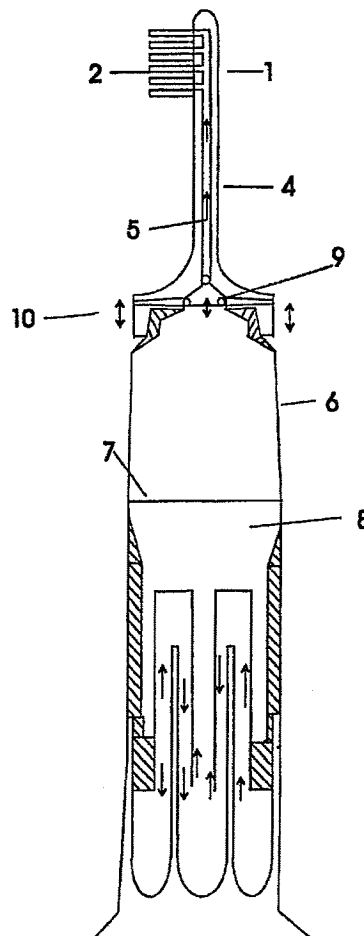


Fig.1

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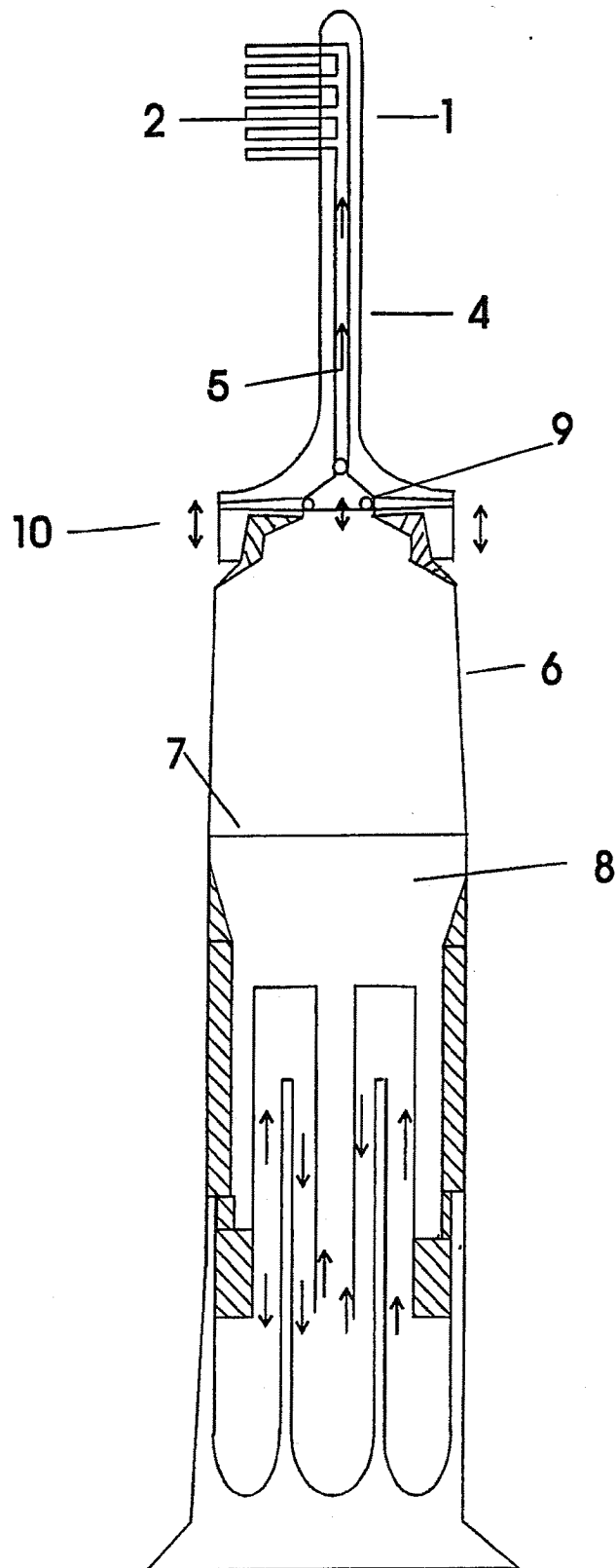


Fig.1

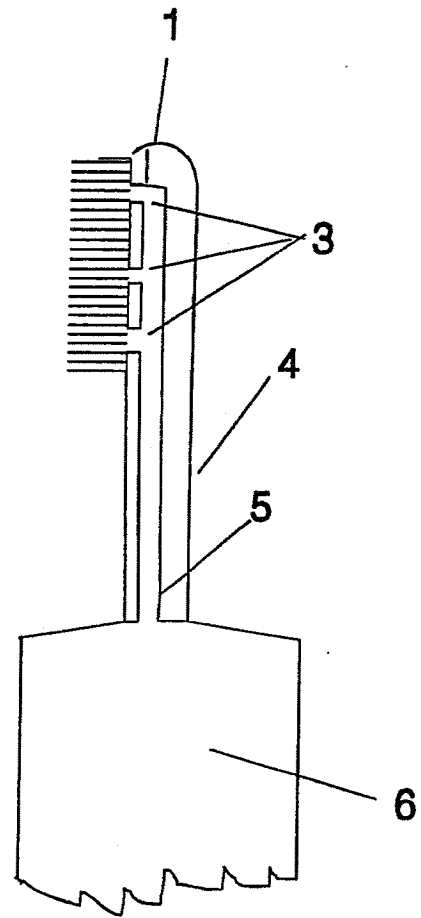
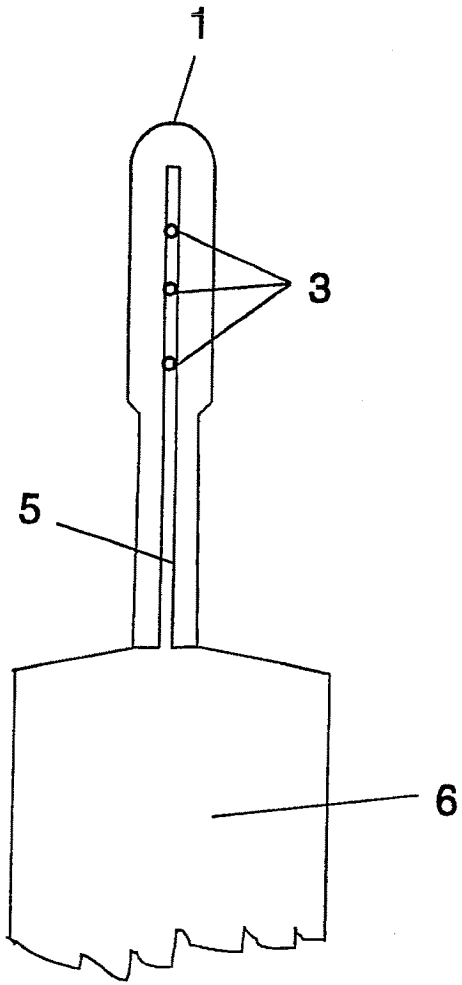


Fig. 2

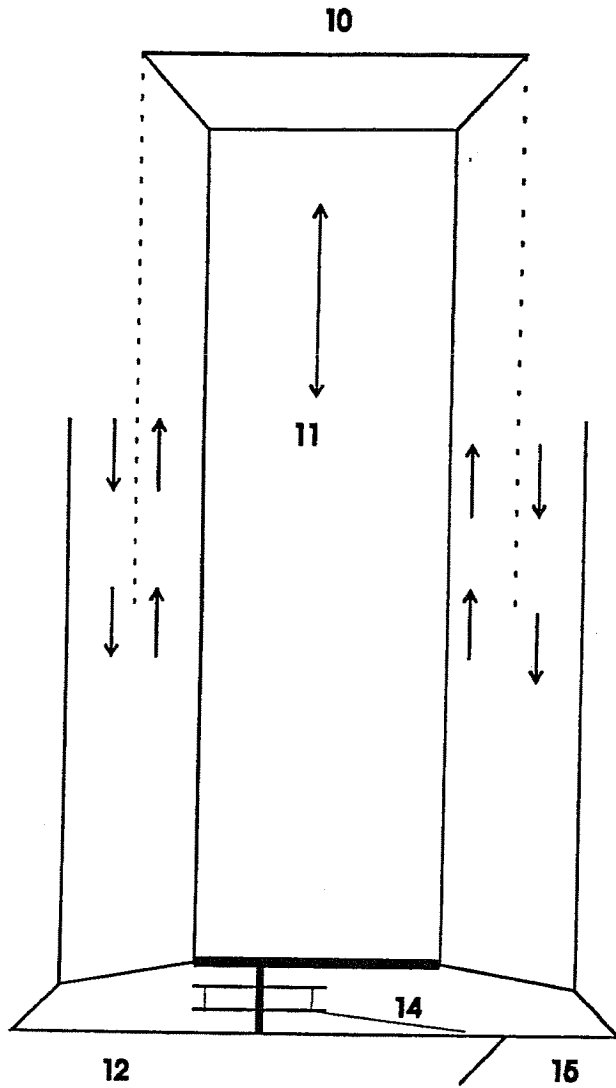


Fig. 3

The present invention relates to a toothbrush which can automatically be fed with fluid whilst in use. It is particularly beneficial for use with a mouthwash or other liquids associated with dental hygiene purposes.

Conventional toothbrushes can clean teeth where they can reach but cannot remove particles, etc. in inaccessible places. In dental surgeries, high speed drills and high pressure liquid jets can be used to clean places where toothbrushes cannot reach but these are not suitable for use by the individual.

I have now invented an improved toothbrush which incorporates liquid dispensing nozzles to facilitate teeth cleaning.

According to the invention there is provided a toothbrush comprising a head, having bristles mounted thereon which head has at least one hole forming a jet through which liquid can pass; attached to the head is a handle, having a liquid carrying conduit formed in it, which conduit is connected to the said hole or holes, there being a liquid dispensing means connected to the handle, whereby liquid released from the liquid dispensing means can pass through the conduit and out through the hole or holes.

By 'bristles' is meant any material which can be used for making toothbrushes such as animal bristles, plastic bristles - such as nylon, polypropylene, etc. or any other suitable material. The hole in the head should be formed so that liquid is preferably directed out in the direction of the bristles.

The head can be of any conventional toothbrush type and it is a feature of the invention that people would be able to use toothbrushes which would have a similar brushing action to those they currently use. The number of jets in the head and their disposition will depend on the shape, size and configuration of the head and a suitable number used accordingly.

The jets in the toothbrush head can be positioned in a pattern which is suitable to allow the liquid to co-operate with the brushing action. The conduit is preferably formed in the handle as a hollow tube in the centre of the handle.

The handle is preferably integral with the head so that it can be formed in a single moulding with the conduit and jet or jets forming part of a continuous channel.

The liquid dispensing means is preferably detachably connected to the handle so that a range of heads can be connected to one liquid dispensing means. The connection can be a screw fit or a pressure fit and should be water tight to prevent leakage passing from the liquid dispensing means to the head.

In a preferred embodiment of the invention, the liquid dispensing means is adapted to fit into the hand of a user.

Preferably, in use, the liquid dispensing means would be pressurised so that liquid could be automatically forced out through the jet. It would also be desirable for the release of liquid from the liquid dispensing means to be readily controlled by a valve which could be activated by the user, e.g. by pressure. The pressurised liquid dispensing means preferably comprises a cylindrical container, having a diaphragm or piston fitted within it. In use the upper portion of the container connected to the handle contains liquid so that pressure on the diaphragm forces the liquid through the conduit and out through the jet or jets in the toothbrush head. The pressure on the diaphragm can be formed by compressed gas, e.g. from pressure cylinders or by pre-pressurising the space below the diaphragm by means of an air pump. The pressure exerted on the diaphragm is adjusted to give the appropriate velocity to the liquid coming out of the jet or jets in the toothbrush head.

Alternatively, there can be a tube which fits into the conduit at one end with the other end being under the surface of liquid contained in the liquid dispensing means. Pressure exerted on the space above the liquid surface will force liquid along the tube and out through the jet or jets.

If desired, there can be a hand operated pumping means attached to or forming part of the liquid dispensing means so that liquid can be continuously forced out of the jet or jets by a continuous or intermittent pumping action whilst the toothbrush is in use.

In one embodiment of the invention there can be a second liquid containing chamber adjacent to or forming part of the liquid dispensing means which, in use, can contain a liquid such as a mouthwash or a tooth treating liquid such as an anti-plaque liquid. In addition, or alternatively for ease of storage, there can be a chamber which can hold the toothbrush handle when not in use. When it is desired to use the toothbrush, the handle can then be fixed onto the liquid dispensing means, as described above. Optionally, in the base of the liquid dispensing means, can be a chamber which can contain other tooth cleaning accessories such as dental floss or toothpicks, etc.

The invention will now be described with reference to the accompanying drawings in which :-

Fig. (1) is a side view of one embodiment of the invention, Fig. (2) is a view of part of the device of the invention and Fig.3 is a partial view of a different embodiment of the invention

Referring to Figs. 1 and 2 a toothbrush head (1) has bristles (2) attached to it. In the head are jets (3). Attached to and forming part of the head (1) is handle (4), having conduit (5) formed in it. The handle (4) is connected to a container (6) forming the liquid dispensing means. In the container (6) optionally there can be a diaphragm (7), slidably mounted within it, with liquid contained above it. Below the diaphragm (7) is a compressed air chamber (8) which can be pressurised by means of air being pumped into it. In the chamber (8) is a conventional compressed air storing means (not shown). In the neck of handle (4) is a valve (9) which is opened by pressure on handle (4) in the direction of the arrow, e.g. by the thumb of the user.

In operation the compressed air chamber (8) is pressurised so that when it is desired to squirt liquid through the jets (3) the valve (9) is opened by pressure in the direction of the arrow causing liquid to pass through conduit (5) and out through the jets (3).

Referring to Fig. 3, pump flange (10) is connected to pump body (11) which can move up and down as shown. The pump is gripped by pump grip (12). Air is extracted, as shown by the arrows. In the base is dental floss (14) which can be withdrawn through cutter (15).



**Claims**

1. A toothbrush comprising a head having bristles mounted thereon, which head has at least one hole formed in it, forming a jet through which liquid can pass, there being a handle attached to the head, which handle has a conduit formed in it connected to the said hole or holes in the head, there being a liquid dispensing means connected to the handle, whereby liquid released from the liquid dispensing means can pass through the conduit and out through the hole or holes.
2. A toothbrush, as claimed in Claim 1, in which the conduit in the handle is a hollow tube substantially in the centre of the handle.
3. A toothbrush, as claimed in Claim 2, in which the head and handle are integral, with the hole or holes forming a continuous channel with the conduit.
4. A toothbrush, as claimed in any one of Claims 1 to 3, in which the liquid dispensing means is detachably attached to the handle.
5. A toothbrush, as claimed in any one of Claims 1 to 4, in which the liquid dispensing means is adapted to fit into the hand of the user.
6. A toothbrush, as claimed in any of Claims 1 to 5, in which the liquid dispensing means can be pressurised to force liquid out through the hole or holes.
7. A toothbrush, as claimed in Claim 6, in which the liquid dispensing means is pressurised by the action of a compressed gas acting on a diaphragm in contact with a liquid containing chamber connected to the conduit in the handle of the toothbrush.
8. A toothbrush, as claimed in Claim 7, in which the liquid dispensing means is pressurised by a pumping means which can be operated by the user of the toothbrush and which can pressurise the liquid dispensing means.

9. A toothbrush, as claimed in Claim 7 or 8, in which the release of liquid from the liquid dispensing means is controlled by means of a valve operated by the user of the toothbrush.
10. A toothbrush, as claimed in any one of Claims 1 to 9, in which there is a separate chamber into which the handle of the toothbrush can fit when not in use.
11. A toothbrush, as claimed in any one of Claims 1 to 10, in which there is a chamber attached to or forming part of the liquid dispensing means, which chamber is adapted to contain tooth cleaning accessories.
12. A toothbrush, as described herein, with reference to the accompanying drawings.

**Relevant Technical Fields**

- (i) UK Cl (Ed.N) A4K (KBA)  
(ii) Int Cl (Ed.6) A46B 11/00, 11/02, 11/04

Search Examiner  
M R WENDT

Date of completion of Search  
27 MARCH 1995

**Databases (see below)**

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant  
following a search in respect of  
Claims :-  
1-12

(ii)

**Categories of documents**

- X:** Document indicating lack of novelty or of inventive step.      **P:** Document published on or after the declared priority date but before the filing date of the present application.
- Y:** Document indicating lack of inventive step if combined with one or more other documents of the same category.      **E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.
- A:** Document indicating technological background and/or state of the art.      **&:** Member of the same patent family; corresponding document.

| Category | Identity of document and relevant passages |   | Relevant to claim(s) |
|----------|--|---|----------------------|
| X,P      | GB 2269090 A                               | (FIRTH) see Figure 4, page 3 lines 15 etc                 | 1, 3, 5, 6           |
| X        | GB 2203636 A                               | (JELINEK) see Figure 6, Claims 1, 3                       | 1, 3, 4, 5           |
| X        | GB 2201887 A                               | (GOOLD) see Figures 6, 8 and 9 Claims                     | 1-6                  |
| X        | GB 2175799 A                               | (SAIZ) see Figure 1 page 1 lines 101-110                  | 1, 5                 |
| X        | GB 2070922 A                               | (LINGNER) see Figure 4                                    | 1-4                  |
| X        | GB 0921206                                 | (MAGEL) see figure Claim 1                                | 1-3, 5               |
| X        | GB 0751211                                 | (MAGEL) see Figure Claim 1                                | 1-3                  |
| X        | GB 0728343                                 | (MAGEL) see figure Claim 1                                | 1-3                  |
| X        | GB 0469793                                 | (SINGER) see Figure 1 Claim 1                             | 1-3                  |
| X        | EP 0290873 A2                              | (KAO) see Figure 3 Claim 1 page 4 lines 27 to 40 Abstract | 1, 5                 |
| X        | US 4875791                                 | (HASSAN) see Figures 1 and 2 Abstract                     | 1, 5                 |